

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
20 March 2003 (20.03.2003)

PCT

(10) International Publication Number  
**WO 03/022705 A1**

(51) International Patent Classification<sup>7</sup>: **B65D 45/32, 55/02**

(21) International Application Number: PCT/GB02/03777

(22) International Filing Date: 13 August 2002 (13.08.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
0122099.5 12 September 2001 (12.09.2001) GB

(71) Applicant (for all designated States except US): **TECH-NOCAPS LIMITED** [GB/GB]; 41 Roseburn Terrace, Edinburgh EH12 5NQ (GB).

(71) Applicant and

(72) Inventor: **MESTRINER, Romeo** [IT/IT]; Via Swinburne 14, I-16148 Genoa (IT).

(74) Agent: **FITZPATRICKS**; 4 West Regent Street, Glasgow G2 1RS (GB).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

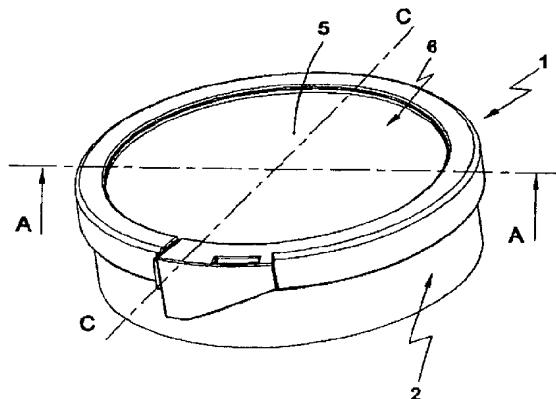
(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CLOSURE FOR CONTAINERS, IN PARTICULAR FOR CONTAINERS OF CARBONATE DRINKS



**WO 03/022705 A1**

(57) Abstract: Closure (1) for containers (2) constituted by two elements: a first element comprising a disk (5) fitted with sealing means (6) for the opening of the container while a second element in the shape of a ring (15) functions as a locking device of the first element by locking it to the bead (3) extended along the perimeter of the finish of the container itself. The first element is constituted by a metallic disk (5) including a sealing wad of suitable material. The second element is constituted by a ring (15) with a "C" shaped section that embraces the disk (5) and the external circumference bead (3) of the opening of the container. The ring (15) is fitted with a tab (22) that keeps in an interlocked position the overlapping appendixes (18, 19) of the ring itself.

## CLOSURE FOR CONTAINERS, IN PARTICULAR FOR CONTAINERS OF CARBONATE DRINKS

The invention relates to a closure for containers with an opening with a bead extending along the whole 5 perimeter of the opening itself and destined to contain drinks in general and carbonated drinks in particular.

Such closures are normally composed of a closure crimped or in some way anchored directly to the opening 10 finish by means of a ring-type relief or a bayonet system. Such type of closures have been known for years and are diffused in the drinks market generally produced in metal or plastic and suitable for containers either made of glass or plastic.

15

Such solutions are generally without tamper-evident seal and therefore it is added afterwards a paper label over both closure and container or else the closure itself is secured by means of a heat-shrunk sleeve.

20

Furthermore in other cases, as in the so-called "crown cork", it is necessary to use a tool to be able to open the container.

25

Another problem normally encountered in the solutions using plastic materials is that of permeability to gases that in this case is particularly evident when coupled with containers with a large opening and liquid products sensitive to loss of carbonation or to 30 oxidation.

The aim of the invention is to produce a closure of the type described above that would allow its usage on containers for carbonated drinks, while being easy and

relatively economical to produce, and would allow to maintain a seal while under pressure and would allow opening the closure by the simple pulling of a tab without the assistance of tools or special skills.

5

The objective of the invention is achieved by means of a closure composed of two elements: a first element that includes a disk with means of sealing for the opening of the container while a second element, in the shape of a ring, retains the first element onto the opening by anchoring it to the bead extending along the perimeter of the opening finish of the container itself.

The first element is formed by a metallic disk that includes a seal of suitable material moulded over onto it in such a position as to embrace the external periphery of the opening finish for a predetermined height while a circular flange in contact with the inside of the container seals the opening of the container.

20

The second element is formed by a ring with a "C" shaped section that embraces the disk and the outer perimeter of the bead extending around the opening of the container.

25

Such element is pre-assembled to the disk and therefore the two elements are applied to the container together and at the same time.

30

In accordance with the invention at the time of capping the ring is not deformed by elasticity to go over the external side of the bead of the opening of the container but, as the length of its circumference is adjustable, it is pre-assembled with a diameter slightly

wider than of the external bead of the opening of the container.

When the closure settles onto the opening of the  
5 container with a suitable capping machinery the ring is  
tightened that will then adopt the final dimension useful  
to retain the disk in a sealing relationship onto the  
opening of the container. Advantageously the ring is  
fitted with a pull tab that maintains in the locked  
10 position the two overlapped ends of the ring itself,  
while at the moment of opening the container the tab may  
be removed or bent to allow the unlocking of the two  
ends.

15 The present invention, as it will be better  
explained later, allows furthermore other and further  
advantages that will be illustrated in the description of  
the preferred solution together with the drawings  
wherein:

20

Fig 1 is represented a prospective view of the  
complete closure, fixed on the container finish.

Fig 2 is represented a vertical section of the  
25 closure according to axis A-A, with the retaining ring in  
a intermediate position before tightening.

Fig 2a is represented a detail of the vertical  
section of FIG 2.

30

Fig 2b is represented another detail of the vertical  
section of FIG 2.

Fig 2c is represented an orizontal section along the axis D-D of the closure.

Fig 3 is represented a vertical section of the  
5 closure according to axis A-A with the retaining ring in  
the final sealing position.

Fig 3a is represented a detail of the vertical  
section of FIG 3.

10

Fig 4 is represented a orizontal section along the  
axis B-B of the closure with the retaining ring in the  
intermediate position before tightening.

15

Fig 4a is represented a detail of FIG 4.

Fig 4b is represented a detail of FIG 4a.

Fig 5 is represented an orizontal section along the  
20 axis B-B of the closure with the retaining ring in the  
final sealing position.

Fig 5a is represented a detail of FIG 5.

25

Fig 6 is represented a detail of a vertical section  
of the closure along the axis C-C passing across the  
pull-tab.

With reference from FIG 1 to FIG 3a, it is overall  
30 indicated that 1 a closure applied to a container 2  
fitted with a circular lip 3 extending along the external  
perimeter of its neck 4.

The closure 1 is composed of a disk-like element 5, preferably in metal, including sealing means, and produced by over moulding a crown in plastic materials 6 that covers the outer edge of the disk component itself.

5

In order to guarantee the anchoring between the two components described above, in the disk-like element 5 are made holes 7 near its external edge that allows to connect the upper side 8 and the lower side 9 of crown 6.

10

Crown 6 extends downward on the outer bead of the neck of container 2 for a short space by means of a circular flange 10 while two circular relieves 11 and 11a lie over the flat surface of the neck opening 4 assuring 15 the sealing under pressure.

The circular flange 10 consists of a plurality of binding segments 10a and 10b. Said binding segments are separate from each other by slots 12. In order to secure 20 the disk-like element 5 inside of the looking ring 15 before capping at least three of the binding segments are moulded bent outwards as shown in the right side of FIG 2 and in FIG 2b where are numbered with 10b.

25

Externally to the disk-like element 5 is mounted a ring overall indicated with 15 which has a "C" shaped axial section whose upper wing 16 lies unto the upper wall 8 of crown 6 while the lower wing 17 engages under the bead of the lip 3 of the neck of the container 2.

30

Ring 15 is fitted with an interruption along its circumference and the connection between its two free ends is obtained by means of two appendixes 18 and 19 that overlap for a limited space as indicated in FIG 4 and FIG 4a.

The closure, before been applied to the container is pre-assembled with appendixes 18 and 19 partially overlapping. On the external surface of appendix 19 are positioned axial saw-tooth indicated and 20 and 20a, 5 while on the internal surface of appendix 18 are positioned axial saw-teeth 21 and 21a. In the intermediate pre-assembly position at least one tooth 20 engages onto one tooth 21.

10 Advantageously, as indicated in FIG 4b the inclined back of saw tooth 20 is oriented towards appendix 18 helping the overcoming of tooth 21 whose back is instead oriented towards the appendix 19. The face of tooth 20 forms preferably a "X" angle comprised within 5° and 20° 15 with the radius passing on the edge of the tooth, while the back will have an angle "Y" comprised within 60° and 75°. The inclination of the two opposite faces overlapping of the saw-teeth 20 and 21 facilitate the engagement of the two appendixes of the ring and their 20 correct positioning.

The FIG 6 shows as the positioning is also assured by means of a tab 22 extending axially in correspondence with appendix 19 and connected by means a shoulder 23 to 25 the upper wing 16 of ring 15.

Shoulder 23 is fitted with a weakening line 21 that allows the separation of tab 22 from ring 15 at the moment of opening the container 2. The tear-off tab 22, 30 during the phase preceding the capping operation, maintains in position the overlapping appendixes of the ring thus avoiding that the ring opens up and therefore that the disk-shaped top comes apart from the rest of the closure.

During the capping operation the closure is positioned on top of the neck of container 2 and ring 15 positions itself around neck finish 3 without any interference between the neck finish and the lower wing 5 17 of the closure. By means of a suitable capping head a vertical pressure is applied onto the closure and by means of mobile radial elements on the capping head the external diameter of ring 15 is reduced by increasing the overlapping of the two appendixes 18 and 19. Preferably, 10 as shown in the FIG 5 and FIG 5a of the example of realisation of the invention the saw-teeth are at least two for each appendix.

It is thus achieved the overcoming of the saw-teeth 15 21 and 21a in relation to saw-teeth 20 and 20a, securing the positioning of wing 17 under the circular bead 3 of opening finish 4 of container 2.

In this way it is improved the seal of the container 20 by means of appendixes 11 and 11a of crown 6 that position themselves on the top surface of opening finish 4 of container 2. The tear tab 22 will undergo a deformation by elasticity during such overcoming and, when the two appendixes 18 and 19 will have reached the 25 final position, it will ensure the irreversibility of their sliding movement and it will avoid therefore the accidental opening of the container.

At the same time the binding segments 10a snap under 30 the bead 14 of opening finish 4 of container 2.

The binding segments 10b moulded bent outwardly thanks to their flexibility bend towards the bead 14 and engage under the same bead 14 like the other binding

segments 10a. Between the lower part of the bottle bead 14 and the upper part of the bead 13 of the binding segments 10a and 10b a suitable gap is provided for allowing the venting process during opening.

5

The consumer, in order to open the container, will have to flip upwards the tear off tab 22 freeing in the process the two appendixes 18 and 19 of ring 15 and by applying a full force in a radial direction the saw-teeth 10 will be disengaged, the ring will be open and it will be possible to remove it and therefore freeing the disk-like element of the top seal. The sealing means 11 and 11a relax or loose the pressure applied over the mouth of the container 2 for hermetic purpose. Thus the venting 15 process take place in a secure way, considering that the binding segments 10a grip under the neck finish bead 14 of the container 2. The binding segments 10b thanks to their resilient memory bend outwardly and consumer can use one of them to pull-off the disk-like element 5 from 20 the container.

The closure, according to the present invention, is assembled to form a single element which can be handled individually simply by inserting along axis x-x the first 25 element onto the second element of ring-like form partially closed, so that the two elements do not become separated during handling and transport.

The closure, assembled in such a way, is ready to be 30 positioned onto the opening finish of container by means of a device that exerts a vertical pressure and at the same time tightens its external lateral surface.

The advantage that is obtained from using a closure according to the invention consists in the fact that the ring that secures the top to the container is not deformed by elasticity during the capping operation but 5 it is tightened around the opening finish by means of a radial movement without any stress being applied to the closure.

In this way any deformation or enlargement that may 10 compromise the seal is avoided, the materials employed to manufacture the ring need not be particularly resilient and tough at the same time, and therefore difficult compromising solutions are avoided where maintaining the seal over a long period of time, particularly for 15 carbonated products or sensitive to oxidising or to contact with other gases, is not easy. Another advantage that is obtained with a closure according to the invention is to have an axial push that acts on wing 17 of the ring that may be sized as required due to the fact 20 that it does not have to overcome elastically the opening finish 3 during capping, and such feature makes this closure particularly suitable for capping large mouth containers. The axial pressure is marginal on the saw-teeth that hold the two appendixes of the ring together 25 and therefore it is sufficient a minimum contrast to hold them together. Such a contrast is assured by a tab that when flipped upward at the moment of opening is used as grip to release the ring and to separate it from the container.

30

The closure according to the invention allows therefore the closing of containers for carbonated drinks overcoming the setbacks presented by devices of known techniques. The present invention is realised in a

device that guaranteed the seal of pressured containers and at the same time is of easy and simple fabrication and of easy use. Obviously an expert of this technology in order to satisfy specific and contingent requirements 5 may introduce numerous specifications and variations to the closure as described above, without departing the scope thereof as defined by the following claims.

**CLAIMS**

1. Closure for containers for carbonated drinks and non carbonated drinks made of two components: the first in  
5 the shape of a disk fitted with sealing means to the finish of the container and a second element in the shape of a ring having axially a "C" shaped section where an upper wing holds the above mentioned disk while the lower wing is positioned below a bead extended along the whole  
10 external perimeter of the neck of the opening of the container, characterised by the fact that the ring is interrupted in at least one point and that interlocking means are provided on it.
  
- 15 2. Closure according to claim 1 in which the interrupted ring has the appendixes overlapping along the circumference.
  
- 20 3. Closure according to claims 1 and 2 in which the interlocking means are located in correspondence of the free appendixes 18 and 19 of the ring overlapping along the circumference and in contact between themselves.
  
- 25 4. Closure according to claim 3 in which the interlocking means located in correspondence of the internal free appendix of the ring are constituted by at least one radial relief in the shape of a saw-tooth.
  
- 30 5. Closure according to claim 3 in which the interlocking means located in correspondence of the external free appendix of the ring are constituted by at least two radial relieves in the shape of a saw-tooth.

6. Closure according to claims 1 and 2 in which the interlocking means located in correspondence of the internal free appendix of the ring include a tear off tab 22 extending axially in correspondence of such an 5 appendix and connected to the upper wing of the ring by means of a shoulder 23.

7. Closure according to claim 6 in which the joining shoulder between the tab 22 and the ring 10 is weakened 10 along the direction of the circumference.

8. Closure according to claims 6 and 7 in which the tab 22 retains in contact the two overlapping appendixes 18 and 19 of the ring when these are in working position.

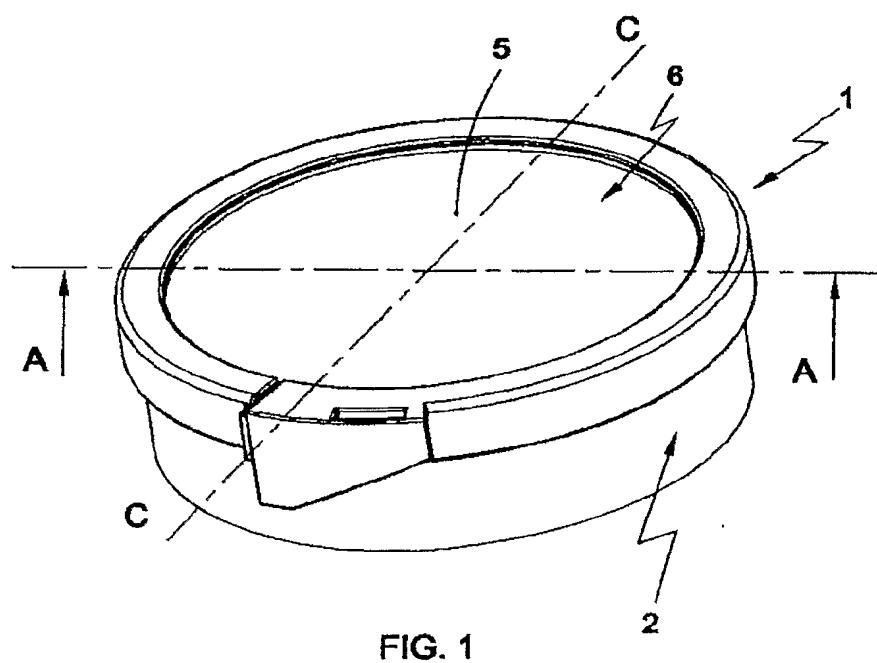


FIG. 1

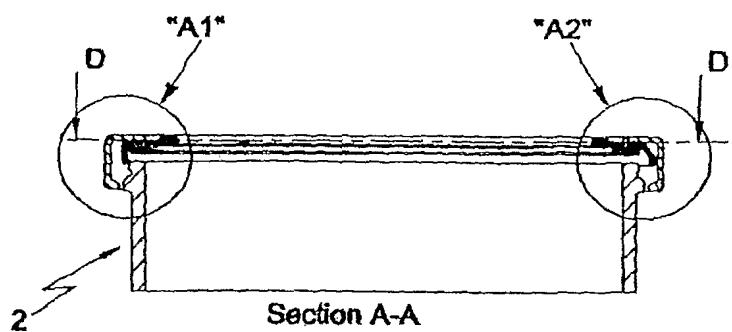


FIG. 2

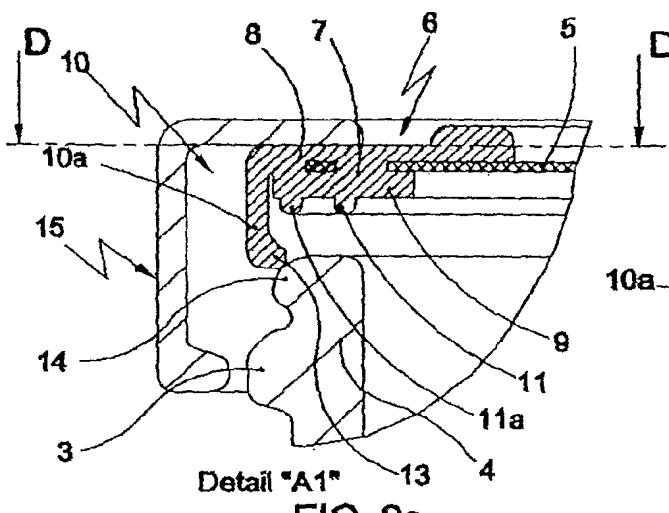


FIG. 2a

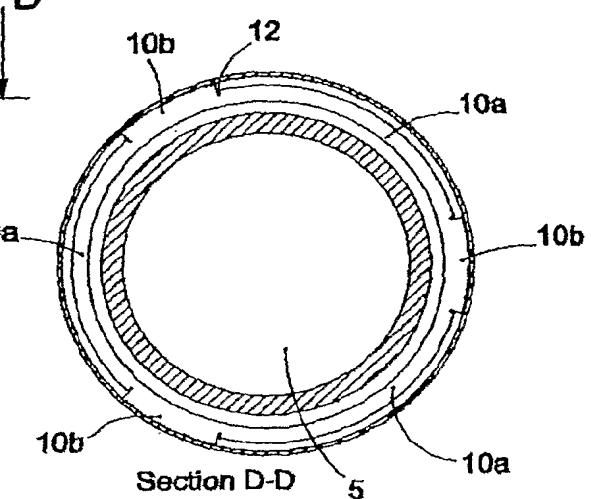


FIG. 2c

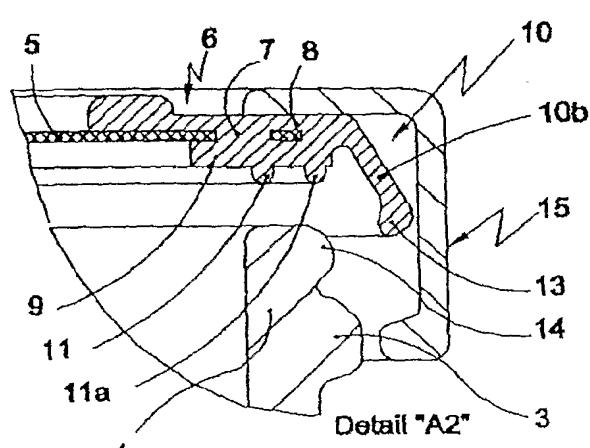


FIG. 2b

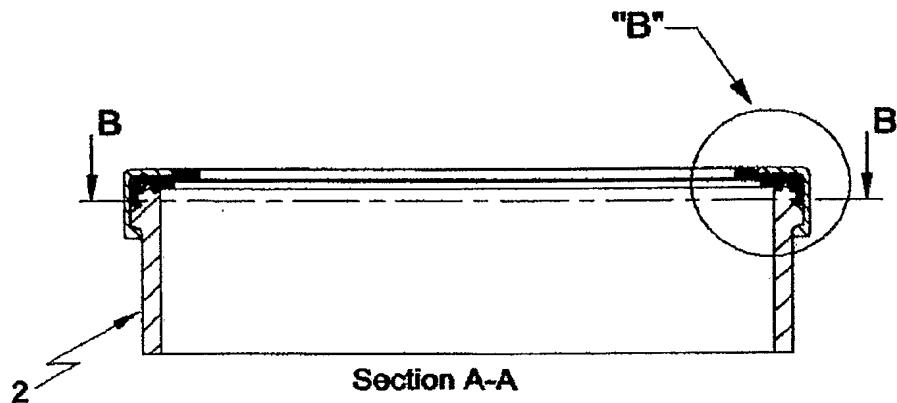


FIG. 3

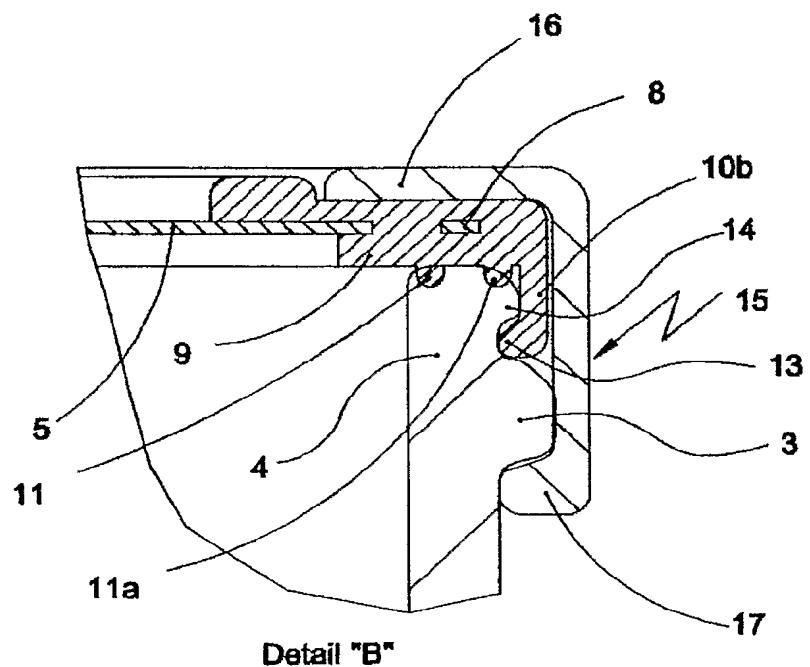


FIG. 3a

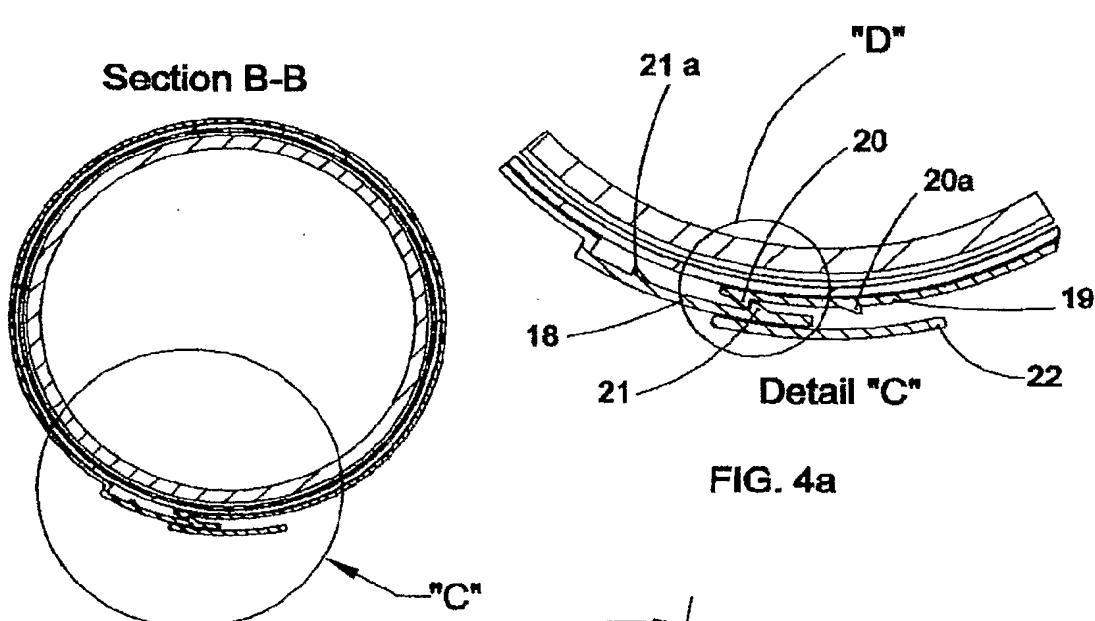


FIG. 4a

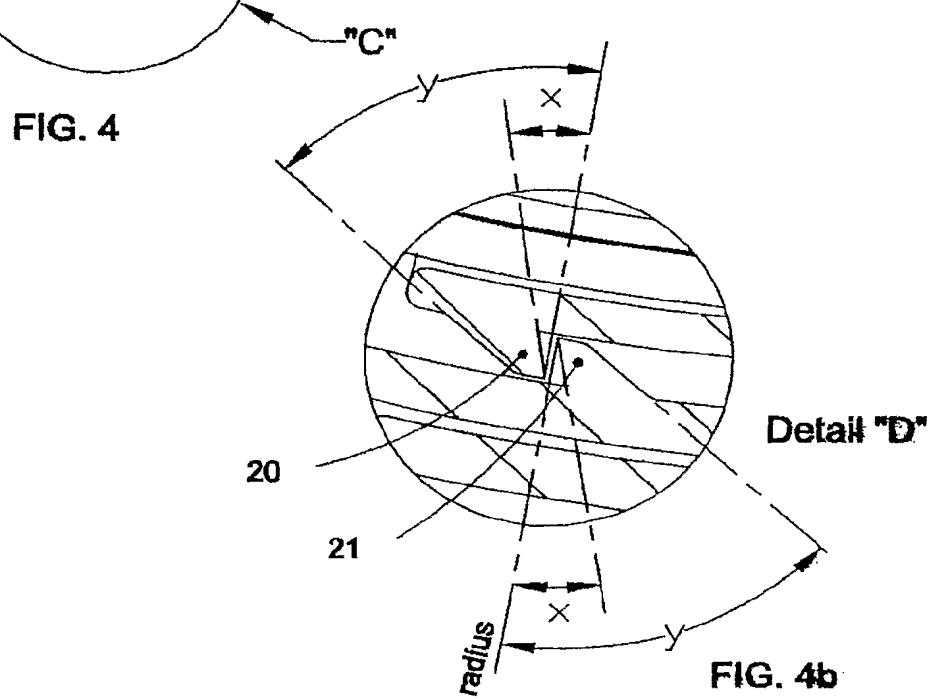


FIG. 4b

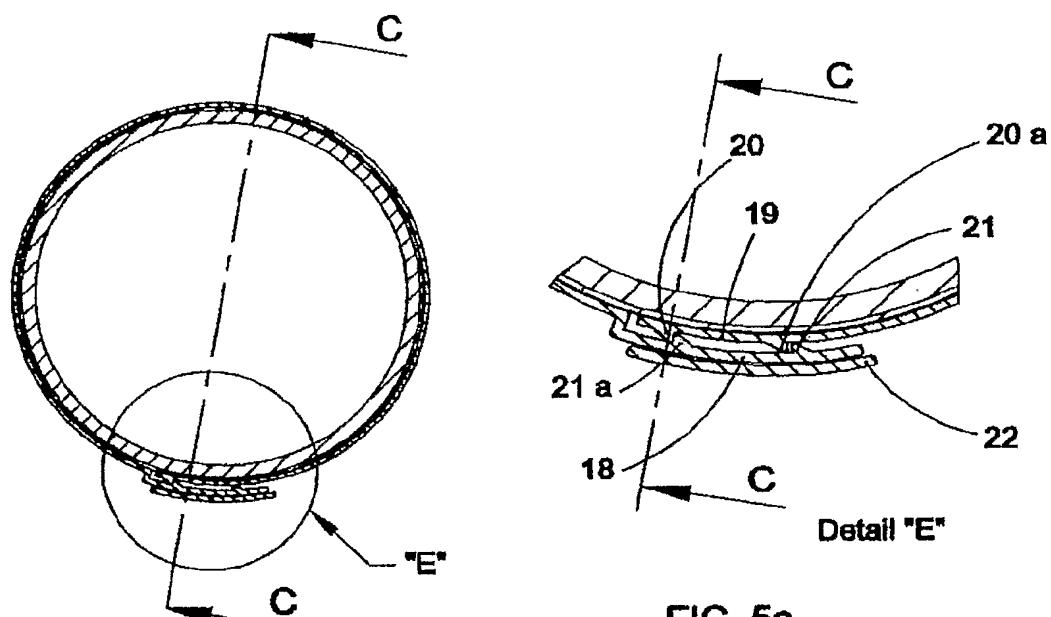
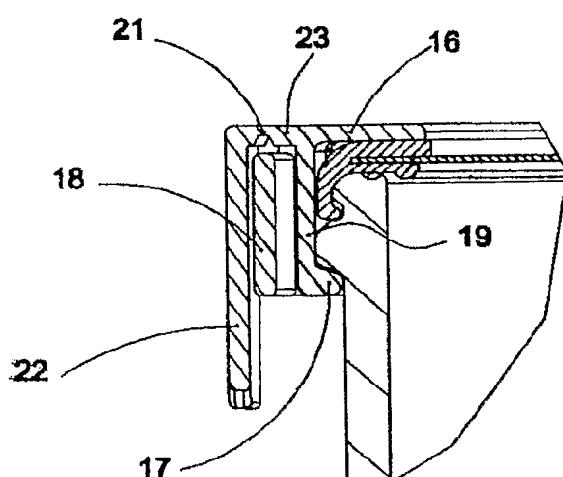


FIG. 5

FIG. 5a



Section C-C

FIG. 6

## INTERNATIONAL SEARCH REPORT

PCT/GB 02/03777

**A. CLASSIFICATION OF SUBJECT MATTER**  
**IPC 7 B65D45/32 B65D55/02**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**Minimum documentation searched (classification system followed by classification symbols)  
**IPC 7 B65D**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**EPO-Internal****C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category <sup>a</sup>	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 17 21 662 U (WECKER JOSEF) 3 May 1956 (1956-05-03) page 6, paragraph 8 -page 8, paragraph 6; figures 1-10 ---	1-5
X	US 2 776 159 A (WILLIAM COOKSON) 1 January 1957 (1957-01-01) column 1, line 62 -column 2, line 63; figures 1-9 ---	1-5
X	DE 37 14 890 A (MUHR & SOEHNE) 1 December 1988 (1988-12-01) column 2, line 65 -column 3, line 40; figures 1-7 ---	1-5 -/-

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

## ° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

- "&" document member of the same patent family

Date of the actual completion of the international search

25 November 2002

Date of mailing of the international search report

10/12/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Fitterer, J

## INTERNATIONAL SEARCH REPORT

PCT/GB 02/03777

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 194 772 A (MORGAN GERARD J III ET AL) 25 March 1980 (1980-03-25) column 2, line 20 -column 3, line 41; figures 1-4 -----	1-3
Y		6
X	US 2 327 456 A (PUNTE WILLIAM F) 24 August 1943 (1943-08-24) column 2, line 18 -column 3, line 48; figures 1-5 -----	1-3
A		7,8
Y	US 4 363 421 A (SHOEMAKER RICHARD G) 14 December 1982 (1982-12-14) column 2, line 64 -column 3, line 12; figure 3 -----	6
A		7,8

## INTERNATIONAL SEARCH REPORT

PCT/GB 02/03777

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
DE 1721662	U	NONE		
US 2776159	A	01-01-1957	NONE	
DE 3714890	A	01-12-1988	DE 3714890 A1	01-12-1988
US 4194772	A	25-03-1980	NONE	
US 2327456	A	24-08-1943	NONE	
US 4363421	A	14-12-1982	NONE	